

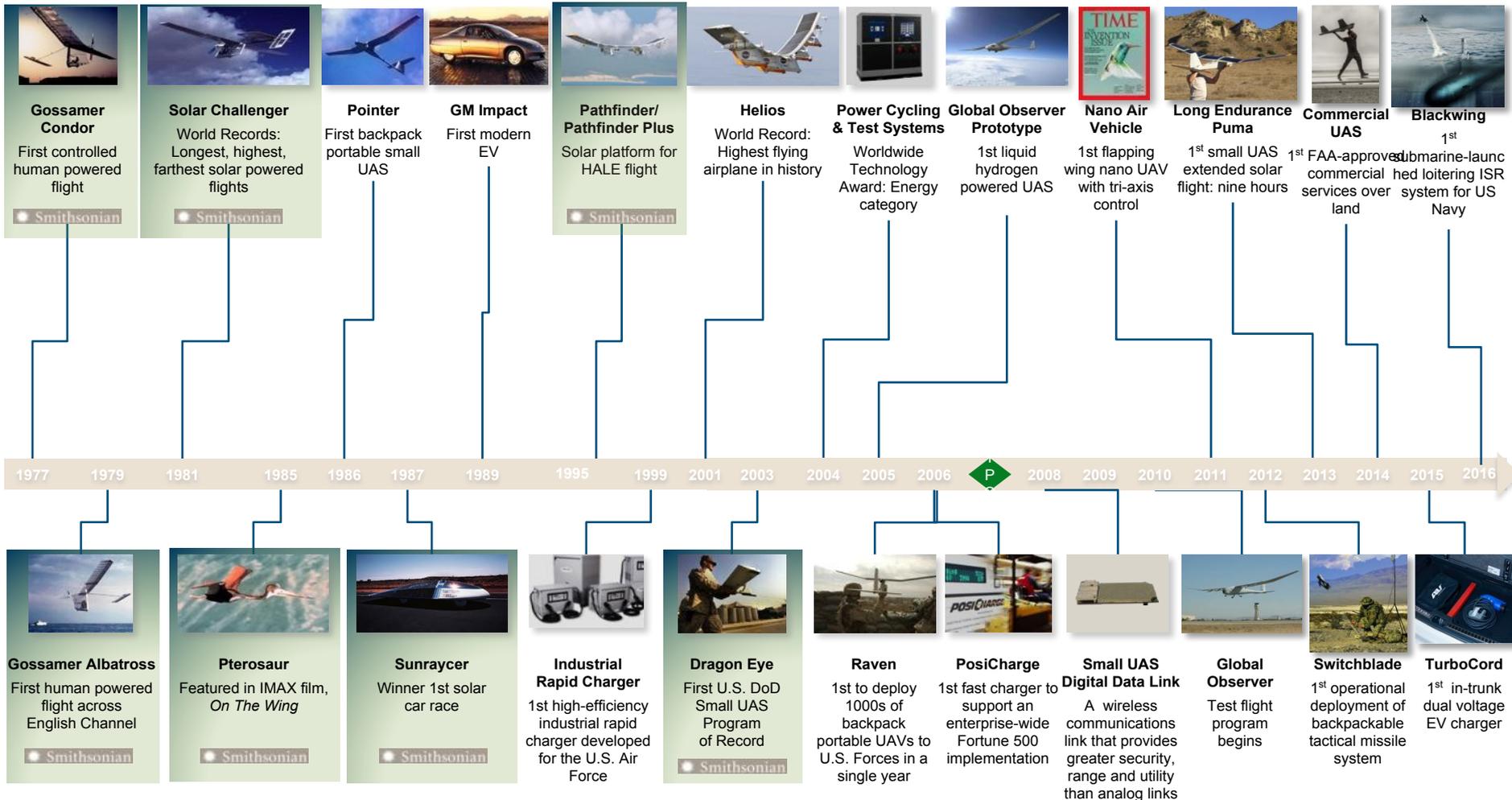


# NOAA UAS Program Review – AV Overview

9 March 2017

Brian Walsh, Director Business Development

# AeroVironment: An Enduring Success Story of Innovation, Intellectual Property and Entrepreneurship



# Puma Evolution



**2008**

## **Puma AE Analog**

- 2 hrs endurance
- All Environment
- EO/IR Gimbal
- Analog Real-Time Data Link

## **2010 Puma AE DDL**

- Enhanced "Infinispin" EO/IR Gimbal
- Digital Data Link
- New fuselage and avionics

## **2014 Puma AE II**

- 3+ hrs endurance
- New Fuselage and Propulsion
- Precision IMU
- U/I Enhancements

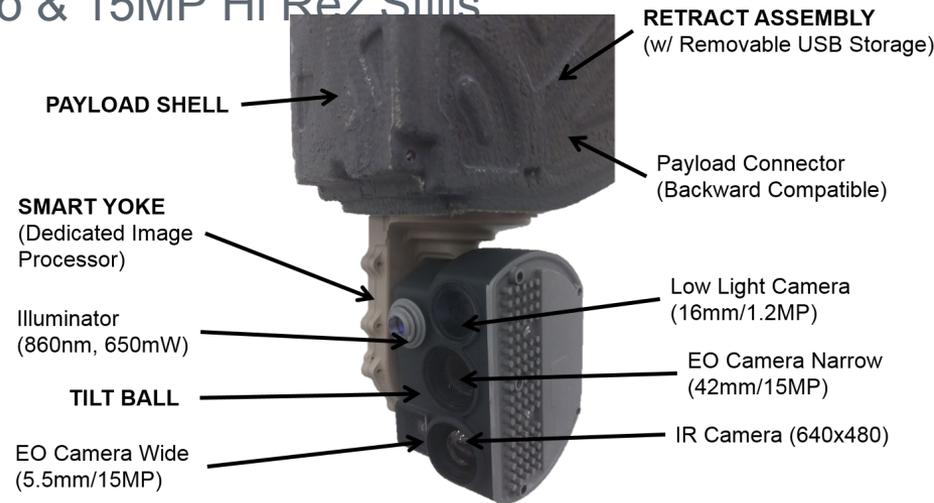
## **2016+ Puma Next Generation**

- Mantis i45 Payload
- Product Improvements

**User Feedback Informs Product Improvements**

# Mantis i45 Payload Specifications

- All-Environment
- Dual 15MP EO Cameras (Wide and Narrow)
- 50X Lossless Zoom (56 to 1.2 degrees HFOV)
- Optional On-board Storage of HD Video & 15MP Hi Rez Stills
- Wide and Narrow Hi-Rez Stills
- Improved 640x480 IR Camera
- New Low Light 1.2MP Camera
- High-Power 650mW Illuminator 860nm
- Video Over Ethernet
- Roll stabilization
- Dedicated Image Processor
- Modular tilt ball supports future expansion



# **i25 vs. i45 Comparison Video**

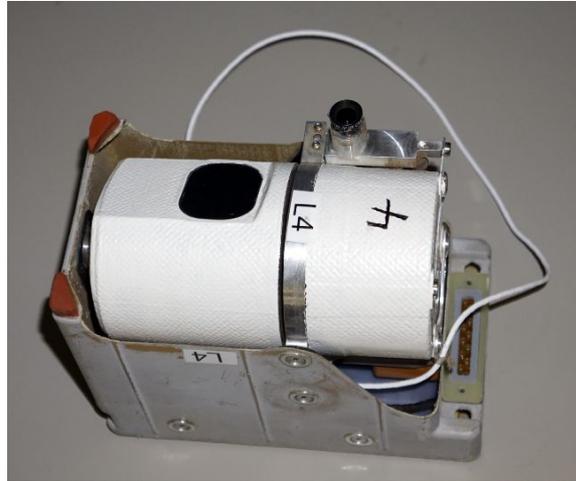
# Commercial UAS Information Solutions

## Photogrammetry Payload

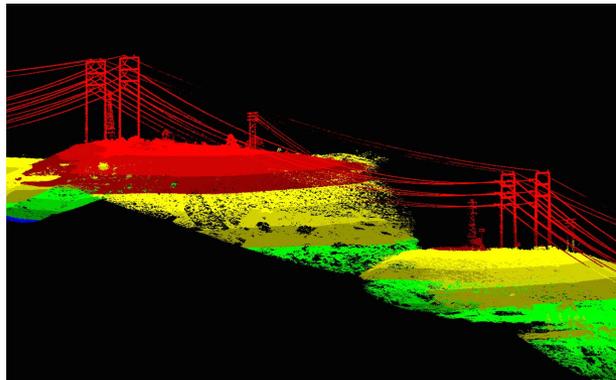
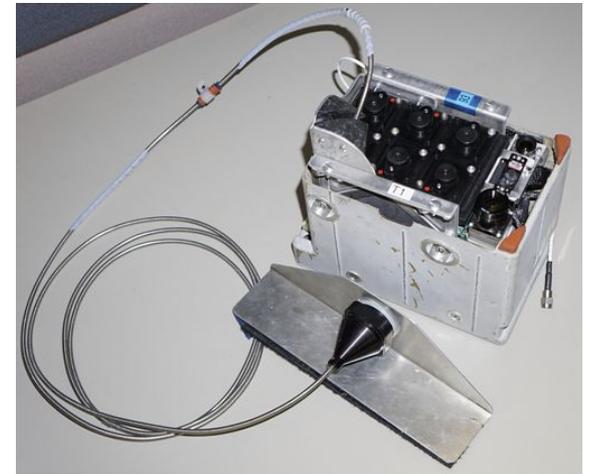
- 24Mpix Sony with 16mm and 20mm



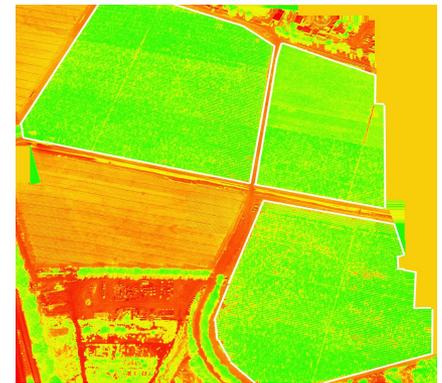
## LiDAR Payload



## Multispectral Payload



Powerline and Towers (Moorpark-Pardee Line)



Agriculture Analysis

# The AV NOAA Years 2008 Forward

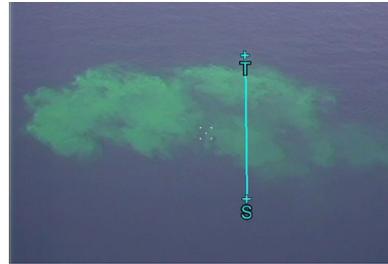
Real World Applications – Successes and Lessons Learned (which also = success)



NOAA\_AV\_ US Coast Guard  
Channel Islands 2009



National Preparedness for  
Exercise Response – Sept. 2011



Blue Whale Tagging, 2012



Trig Island, Puma Flight  
June 2014



Mother-Pup Monk Seal Pair  
Flight 14-006, 19 Jun 2014,



Arctic Shield\_ US Coast Guard  
Healy 2015



Arctic Shield SAR- 2015



May 2015: Refugio Oil Spill



Mapping: Refugio Oil Spill



Antarctica USCG Polar Star 2016



# The Benefits to other US Gov't Agencies

Testing on the NOAA Shearwater enabled Puma Exercises with the US Navy



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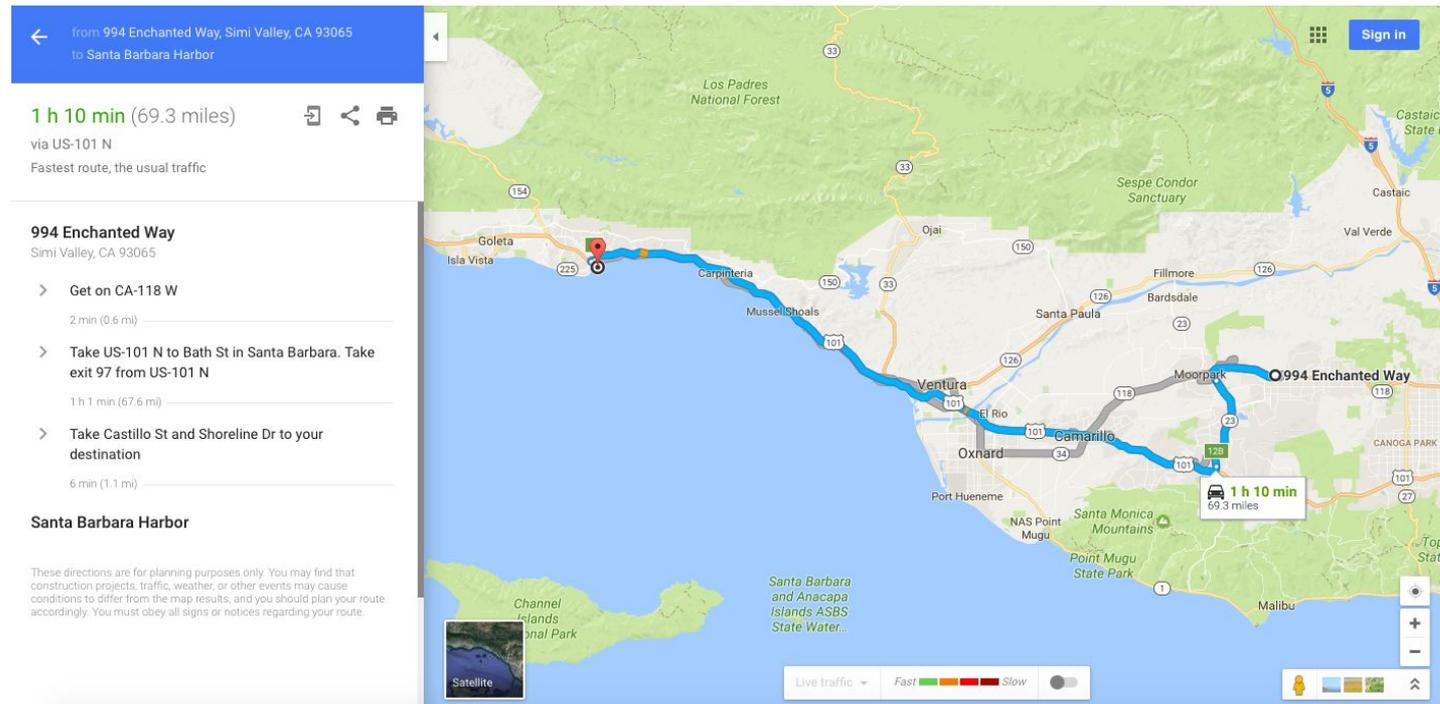
# The AV and NOAA Advantage

## *A Two Way Street*

- Long history of close cooperation with NOAA that includes multiple exercises and technology demonstrations on both NOAA and USCG vessels. These events have provided valuable “lessons learned” for both NOAA and AV.
- Great benefit to NOAA in gaining visibility of new capabilities (platforms and sensors) that are beneficial to NOAA missions.
- Great benefit to AV in the test of new products and technology in environments otherwise unavailable to the company (Arctic/Antarctic/Subtropics) and to receive honest feedback on the product capabilities that are needed to develop solutions that will standup to the mission requirements of different customers (military, scientific and commercial)
- NOAA communicates product capabilities to other government entities through publications and participation in seminars and conferences
- Close relationship of NOAA and USCG provides a path for introduction of AV products to the latter, a key objective of AV business development
- Work with NOAA on oil spill detection provides AV
  - The opportunity to work with NOAA and other agencies, such as the USCG and CA OSPR, in the development of protocols and procedures to operate and collect oil spill data in these emergency situations.
  - Knowledge that is beneficial for commercial Business Development and AV Marketing efforts which are greatly enhanced as a consequence of NOAA feedback and reports

# The AV and NOAA Advantage...con't

*Location...Location...Location*



- Take US-101 67.6 Miles North or South (and its a beautiful drive)
- Close proximity of AV and NOAA facilities (Simi Valley/Ventura/Santa Barbara) makes cooperation easy
- NOAA research vessel is an ideal platform for ongoing test and development of maritime UAVs and NOAA/AV cooperation in these tests has been excellent and invaluable